

6

Troubleshooting

This equipment performs self - checks when certain troubles occur. It emits a buzzer and displays the situation, cause and remedial procedure on the screen in order to notify and assist the operator. It also prompts the operator when it is necessary to perform maintenance. These are collectively referred to as "alarms". This chapter explains about alarms and other possible equipment troubles, their causes and how to remedy the situation. In the following cases, contact the place of purchase or Espec Corp.

- When the equipment fails to operate properly after you have taken the prescribed remedial action.
- Anywhere in this manual that you are instructed to "Call for service".



DANGER

Do the following in event of trouble BEFORE TAKING REMEDIAL ACTION.

- TO PREVENT ELECTRIC SHOCK, without fail, shut OFF power supply at the primary breaker. It is extremely dangerous to work on live equipment. Handling parts while the power is ON could result in electric shock.



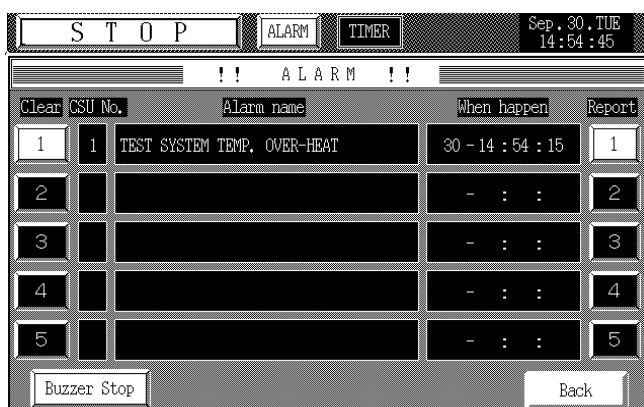
CAUTION

- Shut the main breaker OFF before attempting to access the electric parts compartment. Though power is shut OFF automatically via the door switch when the door to the compartment is opened, forgetting at which point in the system power has been shut OFF might result in accident.

6.1 Displayed alarms

- (1) When this kind of alarm occurs, the below !! ALARM !! display appears on the screen, and with exception to some cases, a buzzer is emitted. Also, if the alarm forces equipment to stop operating, the error state is indicated by the revolving pilot lamp. (Revolving pilot lamp is option)

〔NOTE〕



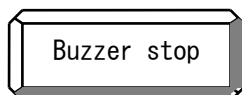
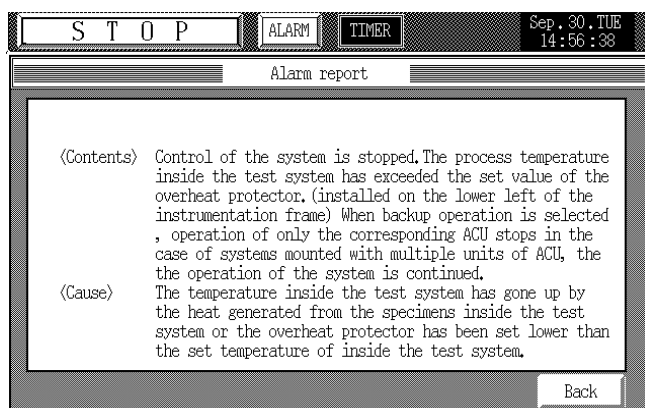
This key starts flashing when an alarm is generated and continues to flash until the alarm is cleared. Also, you can call up the !! ALARM !! display at anytime by pressing this key, except of course while it is already being displayed.

〔Clear buttons〕

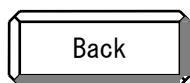
Press the Clear number left of the alarm after you eliminate the cause.

〔Report〕

When you press the Report number right of the alarm, a report is displayed indicating the cause, remedial procedures and a description of the alarm.



When you press this key, the buzzer is silenced.




You can press this key to go back the original display, but the ALARM key will continue to flash until the alarm has been cleared.

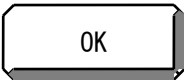
(2) Take the following action when an alarm is generated. There are 2 types of alarms - "Error" and "Warning" - and they are dealt with differently in some respects.

Error: Generated when trouble occurs with the equipment or a single unit (A buzzer is emitted.)

Warning: Generated when control is destabilized for reasons other than trouble such as when maintenance is required (A buzzer is NOT emitted.)

① When an error occurs

- First press  to silence the buzzer.
- Eliminate the cause as instructed in the instruction manual or on the Alarm report display.
- After eliminating the cause, turn power OFF and ON via the POWER key on the operating panel. When an error has occurred, if you press the Clear button, you will be advised that the " Alarm can be cleared only by shutting off the power."

Press  and then turn OFF the power.

- To reactivate power, press the POWER key again.



② When a warning is generated

- Eliminate the cause as instructed in the instruction manual or on the Alarm report display.
- Press the Clear button left of the alarm. Though warnings do not stop chamber operation, the alarm will remain on the !! ALARM !! display until it has been cleared.

〔NOTE〕

Control can be maintained when an error occurs, provided the back - up mode has been turned ON. In the event of a warning, control remains unaffected.

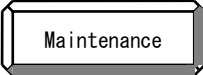
For details on individual alarms, see the alarm tables on the following pages.

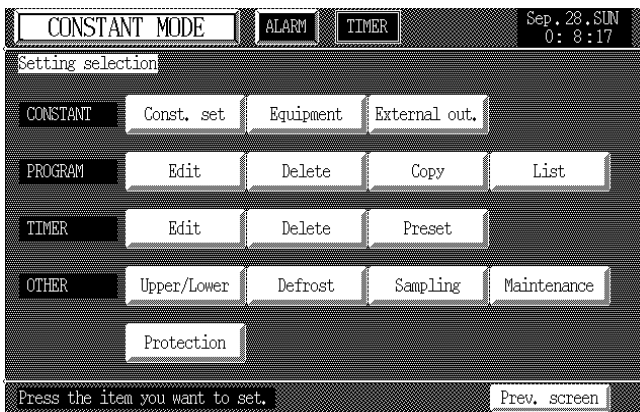
A buzzer is not emitted for warning.


(3) Alarm report display

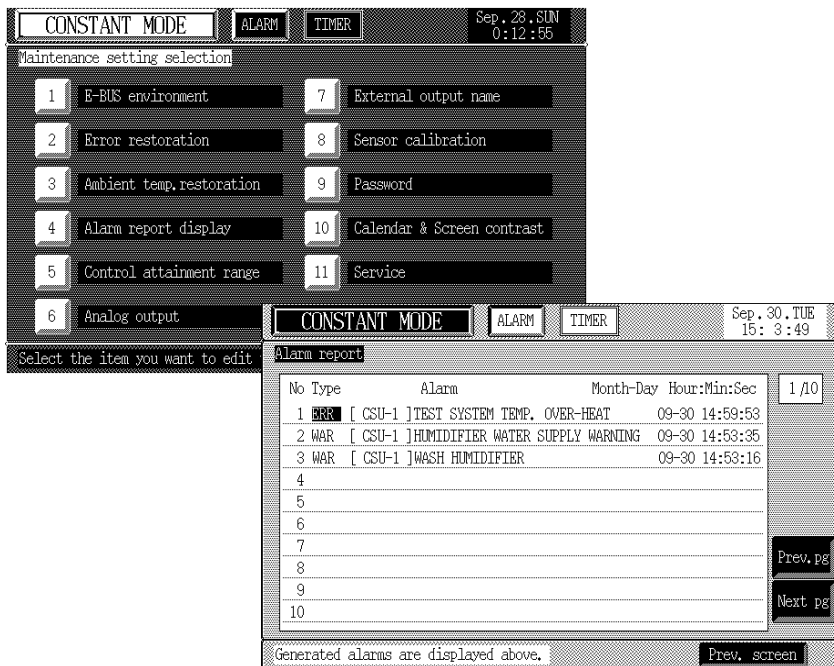
When an alarm has been generated, you can get a report by going through the Maintenance setting selection display. You can get a report on alarms while they are still active, from the !! ALARM !! display described in (1), but alarm entries are deleted the moment the actual alarm is cleared. In any case, you can see all alarms having occurred to date on the Alarm report display.

This display reports other system information such as refrigerator defrosting and humidifier cleaning as well.

Press  on the Settings selection display. This will call up the Maintenance setting selection display.



Press  (Alarm report display). This will call up the Alarm report display where you can check the data.



〔NOTE〕

The Alarm report can hold up to 100 entries. As alarms occur over this number, the system starts overwriting stored data from the oldest alarm first.

It is useful towards equipment management and it helps servicemen analyze trouble, if you periodically check and keep track of alarms.

(4) Equipment response in the back - up mode

This chamber has a back - up function. What it does is to allow equipment unaffected by trouble to keep running when trouble occurs somewhere in the system while the affected unit is shut down. Of course, this is possible only when the back - up mode is ON.

The back - up mode can be turned OFF from the touch screen, but in this situation, the entire system will shut down when trouble occurs.

Though in some cases test conditions cannot be met once the back - up mode kicks in, the mode itself has been added to protect specimens against damage which might occur when the entire system is shut down, as well as to minimize lost time as best possible when total shutdown does in fact occur.

To help you better understand equipment behavior in the back - up mode and so that you may use the chamber more effectively, the below

『NOTE』

In the Alarm tables on the following pages, "BU" is indicated where the back - up mode is available for use. In any case, when two or more air conditioners are used and trouble occurs in one of them, that unit is shut down while the others continue running normally.

For chambers with a single air conditioner

Trouble	Equipment response when back - up mode kicks in	Program response
Humidifier related trouble	Switches over to temperature - only operations.	Pauses. (Held at settings existent at time of trouble.)
Refrigerator related trouble	Unaffected refrigerators continue running. However, the test system shuts down if there is only one refrigerator in the system or if all refrigerators are affected.	Continues running.
Other	Test system shutdown	Stops.

For chambers with two or more air conditioners

Trouble	Equipment response when back - up mode kicks in	Program response
Humidifier related trouble	Affected air conditioner switches over to temperature - only operations. Unaffected air conditioners continue running normally.	Pauses. (Held at settings existent at time of trouble.)
Refrigerator related trouble	Unaffected refrigerators on the affected air conditioner system continue running. However, the air conditioner is shut down if there is only one refrigerator in the system or if all refrigerators are affected. Unaffected air conditioners continue running normally.	Continues running. Pauses if there is only one air conditioner and it stops running.
Air conditioner stops running.	Affected air conditioner is shut down. Unaffected air conditioners continue running normally.	Pauses. (Held at settings existent at time of trouble.)
Total system shutdown	Both affected and unaffected air conditioners stop running	Stops.

(5) Alarm tables

Alarms are displayed as a pretext to the back - up mode kicking - in. If the mode is OFF when an error occurs, the chamber will stop operating. When the chamber has two or more air conditioners, only the effected unit will stop while the other will continue operating. However, in the program mode, units will pause.

The following codes are used in these tables :

BU : Indicates the back - up mode is available against the error in question.

COM. OP: Alarm number of communication function is displayed.(Optional)

Displayed message	COM. OP	Type of alarm		Equipment response	Description	Probable cause (s)	Remedy
		E	W				
SYSTEM ERROR	30	●		Test system down.	System error. (Detected even while the chamber is not running.)	System internal error.	Turn main power breaker OFF and ON again.
LAN CABLE ERROR		●		<ul style="list-style-type: none"> • Test system down. • FAIL lamp lights up if CPU error. 	System error. (Detected even while the chamber is not running.)	<ul style="list-style-type: none"> • CPU trouble in instrumentation subunit. • LAN connection interference. 	Turn main power breaker OFF and ON again.
REF. : TROUBLE	19	●		Test system down.	All refrigerators in error state.	Error notification already made for each separate refrigerator.	Remedy each separate trouble and turn POWER key OFF and ON again.
REF. COOLING WATER FAILURE (Water cooled spec only)	08	●		Test system down.	Water suspension relay tripped because of pressure drop in cooling water line.	<ul style="list-style-type: none"> • Stopped cooling tower pump. • Clogged cooling water strainer. • Water leak in cooling water line. 	<ul style="list-style-type: none"> • Turn POWER key OFF and ON again. • Check cooling pump functions. • Check for leaks in cooling water line. • Clean strainer.
REF. □ unit error (For air - cooled spec. only) □ Indicates refrigerator No.	08	●	BU	For single refrigerator chambers <ul style="list-style-type: none"> • Test system down. For multiple refrigerator chambers <ul style="list-style-type: none"> • Refrigerator changeover and continued operation. In program mode, system does not pause. 	Temperature rise in refrigerator unit discharge pipe, or reverse phase in unit wiring.	<ul style="list-style-type: none"> • Refrigerator breakdown. • Condenser trouble. • Gas leak. • Overheating. • Open - phase. 	<ul style="list-style-type: none"> • Turn POWER key OFF and ON again. • Check cooling water. • Cool down refrigerator.

BU : Indicates the back - up mode is available against the error in question.

Displayed message	C O M P	Type of alarm		Equipment response	Description	Probable cause (s)	Remedy
		E r r o r	W a r n i n g				
REF. <input type="checkbox"/> SURFACE TEMPERA - TURE ERROR <input type="checkbox"/> Indicates refrigerator No.	0 8	●	BU	For single refrigerator chambers • Test system down. For multiple refrigerator chambers. • Refrigerator changeover and continued operation.	Compressor temperature switch tripped because of high surface temperature.	<ul style="list-style-type: none"> • Refrigerator breakdown. • Condenser trouble. • Gas leak. • Overheating. • Open - phase. 	<ul style="list-style-type: none"> • Turn POWER key OFF and ON again. • Cool down compressor.
REF. <input type="checkbox"/> OVER - CURRENT ERROR <input type="checkbox"/> Indicates refrigerator No.	0 8	●	BU	In program mode, system does not pause.	Compressor thermal relay tripped because of overcurrent.	<ul style="list-style-type: none"> • Refrigerator breakdown. • Condenser trouble. • Overheating. • Open - phase. 	<ul style="list-style-type: none"> • Turn POWER key OFF and ON again. • Check cooling water. • Cool down compressor.

BU : Indicates the back - up mode is available against the error in question.

Displayed message	C O M P	Type of alarm		Equipment response	Description	Probable cause (s)	Remedy
		E r r o r	W a r n i n g				
REF. <input type="checkbox"/> HIGH PRESSURE ERROR <input type="checkbox"/> Indicates refrigerator No.	08	●	BU	For single refrigerator chambers. • Test system down.	Refrigeration circuit high pressure switch tripped because of pressure rise.	<ul style="list-style-type: none"> Stopped cooling tower fan Foreign matter inside condenser. 	<ul style="list-style-type: none"> Turn POWER key OFF and ON again. Check cooling water.
REF. <input type="checkbox"/> CONDENSER FAN ERROR (For air - cooled spec. only) <input type="checkbox"/> Indicates refrigerator No.	08	●	BU	For multiple refrigerator chambers. • Refrigerator changeover and continued operation. In program mode, system does not pause.	Condenser fan (for refrigerator) thermal relay tripped because of overcurrent.	<ul style="list-style-type: none"> Overloaded condenser fan. Foreign matter inside condenser. 	<ul style="list-style-type: none"> Turn POWER key OFF and ON again. Check condenser fan.
HUMIDI - FIER BOIL - DRY	21	●	BU	System switches over from temp. & humidity control to temperature - only control. In program mode, system pauses.	Dry - boil temperature sensor tripped because of temperature rise in humidifier cylinder.	<ul style="list-style-type: none"> Heater water supply - line trouble. Foreign matter inside humidifier cylinder. 	<ul style="list-style-type: none"> Turn POWER key OFF and ON again. Clean humidifier.
SCALE IN HUMID. : ACCUMULATION WARNING	21	●		Operation continues uninterrupted. In program mode, system does not pause. * If left unattended for 120 hours, system interprets trouble as error and humidifier stops operating.	Temperature switch inside humidifier cylinder tripped.	Too much scale inside cylinder.	Clean humidifier.
SCALE IN HUMID. : ACCUMULATION ERROR	21	●	BU	System switches over from temp. & humidity control to temperature - only control. In program mode, system pauses.	Temperature switch inside humidifier cylinder has been in error state for 72 consecutive hours.	Too much scale inside cylinder.	Clean humidifier.

BU : Indicates the back - up mode is available against the error in question.

Displayed message	C O M . O P	Type of alarm		Equipment response	Description	Probable cause (s)	Remedy
		E r r o r	W a r n i n g				
	2 1	●	BU	System switches over from temp. & humidity control to temperature - only control. In program mode, system pauses.	Humidifier breaker tripped because of overcurrent.	Short - circuit or leakage current in humidifier circuit.	<ul style="list-style-type: none"> • Turn main power breaker OFF. • Reset humidifier breaker inside electric parts compartment.
	2 1	●		<ul style="list-style-type: none"> • Operation continues uninterrupted. In program mode, system pauses. • Humidifier stops operating. 	Humidifier ON / OFF switch was set to "CLEAN" when humidity test started.	Humidifier is now being cleaned or switch was left in "CLEAN" position. NOTE : Water supply starts as soon as this switch is set to "ON" or when Clear button is pressed.	Always set humidifier switch to "ON" after cleaning.
BLOWER ERROR	0 7	●		Test system down.	Air circulator (AC unit) thermal relay tripped because of overcurrent.	Overloaded air circulator motor.	<ul style="list-style-type: none"> • Turn POWER key OFF. • Halt operations shortly to cool down air circulator motor.
HEATER ERROR	1 1	●		Test system down.	Heater breaker tripped because of overcurrent.	Short - circuit or leakage current in heater circuit.	<ul style="list-style-type: none"> • Turn main power breaker OFF. • Reset heater breaker inside electric parts compartment.
OUTPUT CIRCUIT ERROR	1 9	●		Test system down.	Power circuit breaker tripped because of overcurrent.	Short - circuit or leakage current in power circuit.	<ul style="list-style-type: none"> • Turn main power breaker OFF. • Reset power circuit breaker inside electric parts compartment.

BU : Indicates the back - up mode is available against the error in question.

Displayed message	C O M P	Type of alarm		Equipment response	Description	Probable cause (s)	Remedy
		E r r o r	W a r n i n g				
EXTERNAL TEMP. OVERHEAT ERROR	06	●		Test system down.	Self - contained overheat protector tripped because of abnormal temperature rise inside chamber.	<ul style="list-style-type: none"> • Heat generation from specimens. • Low overheat protector setting. 	<ul style="list-style-type: none"> • Turn POWER key OFF and ON again. • Remove heat -generating specimens. • Check overheat protector setting.
AIR - CONDITIONING LOCAL OVERHEAT	06	●		Test system down.	The heater temperature switch tripped because of abnormal temperature rise inside air conditioner.	<ul style="list-style-type: none"> • Heat generation from specimens. • Heater control error. • Air circulator trouble. • Power breaker was shut off during high temperature testing. 	<ul style="list-style-type: none"> • Turn POWER key OFF and ON again. • Cool down air conditioner to max. 50°C by forcing air inside.
POWER PHASE ERROR	19	●		Test system down.	Reverse phase or open phase detected on primary side (Detected even while the chamber is not running.)	Wrong connection in primary power line.	<ul style="list-style-type: none"> • Turn main power breaker OFF. • Check power supply connections.
POWER PHASE ERROR	30	●		Test system down.	Unusual detection of the substrate (IOU-Di/Do) mounted in the control apparatus of equipment (Detected even while the chamber is not running.)	Wrong connection in primary power line.	<ul style="list-style-type: none"> • Turn main power breaker OFF.

Displayed message	C O M P	Type of alarm		Equipment response	Description	Probable cause (s)	Remedy
		E r r o r	W a r n i n g				
TEST RM T. H - LMT ABSOLUTE ERROR	0 2	●		Test system down.	Temperature inside chamber exceeded upper limit absolute alarm setting.	<ul style="list-style-type: none"> • Heat generation from specimens. • Low upper limit setting. 	<ul style="list-style-type: none"> • Turn POWER key OFF. • Remove heat - generating specimens. • Check upper limit alarm setting.
TEST RM H. H - LMT ABSOLUTE WARNING	2 2		●	<ul style="list-style-type: none"> • Operation continues uninterrupted. In program mode, system pauses. • Humidifier stops operating. 	Humidity inside chamber exceeded upper limit absolute alarm setting.	<ul style="list-style-type: none"> • Temporary rise in RH during step transition in program mode. • Low upper limit setting. 	<ul style="list-style-type: none"> • Check upper limit alarm setting. • Operation is restored automatically when humidity drops below setting.
TEST RM T. L - LMT ABSOLUTE ERROR	0 3	●		Test system down.	Temperature inside chamber dropped below lower limit absolute alarm setting.	<ul style="list-style-type: none"> • Excessive refrigeration. • Cooling caused by specimens. • High lower limit setting. 	<ul style="list-style-type: none"> • Turn POWER key OFF. • Remove trouble - causing specimens. • Check lower limit alarm setting.
TEST RM H. L - LMT ABSOLUTE WARNING	2 3		●	<ul style="list-style-type: none"> • Operation continues uninterrupted. In program mode, system pauses. • Heater stops operating. 	Humidity inside chamber dropped below lower limit absolute alarm setting.	<ul style="list-style-type: none"> • Temporary dropped in RH during step transition in program mode. • High lower limit setting. 	<ul style="list-style-type: none"> • Check lower limit alarm setting. • Operation is restored automatically when humidity rises above setting.

Displayed message	C O M P	Type of alarm		Equipment response	Description	Probable cause (s)	Remedy
		E r r o r	W a r n i n g				
TEST RM T. H - LMT DEVIATION WARNING	0 1		●	<ul style="list-style-type: none"> • Operation continues uninterrupted. In program mode, system pauses. • Heater and humidifier stop operating. 	Temperature inside chamber exceeded upper limit deviation alarm setting.	<ul style="list-style-type: none"> • Heat generation from specimens. • Low upper limit setting. 	<ul style="list-style-type: none"> • Remove heat - generating specimens. • Check upper limit setting and set 10°C higher than test temperature. • Operation is restored automatically when temperature drops below setting.
TEST RM H. H - LMT DEVIATION WARNING (Option)	0 1		●	<ul style="list-style-type: none"> • Operation continues uninterrupted. In program mode, system pauses. • Heater and humidifier stop operating. 	Humidity inside chamber exceeded upper limit deviation alarm setting.	<ul style="list-style-type: none"> • Temporary rise in RH during step transition in program mode. • Low upper limit setting. 	<ul style="list-style-type: none"> • Check upper limit alarm setting and set 10% higher than test humidity. • Operation is restored automatically when humidity drops below setting.
TEST RM T. L - LMT DEVIATION WARNING (Option)	0 1		●	<ul style="list-style-type: none"> • Operation continues uninterrupted. In program mode, system pauses. • Refrigerator stops operating. 	Temperature inside chamber dropped below lower limit deviation alarm setting.	<ul style="list-style-type: none"> • Chamber door is open. • Ventilation fan is running. • Excessive refrigeration. • Cooling caused by specimens. 	<ul style="list-style-type: none"> • Check door and ventilation fan. • Remove trouble - causing specimens. • Operation is restored automatically when humidity rises above setting.
TEST RM H. L - LMT DEVIATION WARNING (Option)	0 1		●	<ul style="list-style-type: none"> • Operation continues uninterrupted. In program mode, system pauses. • Refrigerator stops operating. 	Humidity inside chamber dropped below lower limit deviation alarm setting.	<ul style="list-style-type: none"> • Temporary drop in RH during step transition in program mode. • High lower limit setting. 	<ul style="list-style-type: none"> • Check lower limit alarm setting and 10% lower than test humidity. • Operation is restored automatically when humidity rises above setting.

Displayed message	C O M P	Type of alarm		Equipment response	Description	Probable cause (s)	Remedy
		E r r o r	W a r n i n g				
CONTROL - LER CH1 BURNOUT ERROR	0 0	●		Test system down.	Disconnected CH1 input in temperature controller.	<ul style="list-style-type: none"> • Loose terminals Nos. 3 & 5 on temperature controller EZ - PCSU board. • Disconnected thermocouple. 	Turn POWER key OFF and ON again.
CONTROL - LER CH2 BURNOUT ERROR	0 0	●		Test system down.	Disconnected CH2 input in temperature controller.	<ul style="list-style-type: none"> • Loose terminals Nos. 4 & 6 on temperature controller EZ - PCSU board. • Line break on wire#16,#18. 	Turn POWER key OFF and ON again.
CONTROL - LER CH3 BURNOUT ERROR	0 0	●		Test system down.	Disconnected CH3 input in temperature controller.	<ul style="list-style-type: none"> • Loose terminals Nos. 13 & 15 on temperature controller EZ - PCSU board. • Disconnected thermocouple. 	Turn POWER key OFF and ON again.
CONTROL - LER CH4 BURNOUT ERROR	0 0	●		Test system down.	Disconnected CH4 input in temperature controller.	<ul style="list-style-type: none"> • Loose terminals Nos. 12 & 14 on temperature controller EZ - PCSU board. • Disconnected thermocouple. 	Turn POWER key OFF and ON again.
CONTROL - LER CH5 BURNOUT ERROR	0 0	●		Test system down.	Disconnected CH5 input in temperature controller.	<ul style="list-style-type: none"> • Loose terminals Nos. 19 & 21 on temperature controller EZ - PCSU board. • Disconnected thermocouple. 	Turn POWER key OFF and ON again.
CONTROL - LER CH6 BURNOUT ERROR	0 0	●		Test system down.	Disconnected CH6 input in temperature controller.	<ul style="list-style-type: none"> • Loose terminals Nos. 18 & 20 on temperature controller EZ - PCSU board. • Disconnected thermocouple. 	Turn POWER key OFF and ON again.

Alarms related to optional equipment

BU : Indicates the back - up mode is available against the error in question.

Displayed message	C O M P	Type of alarm		Equipment response	Description	Probable cause (s)	Remedy
		E r r o r	W a r n i n g				
EXTERNAL TEMP. OVERCOOL ERROR (Option)		●		Test system down.	Self - contained overcool protector tripped because of abnormal temperature drop inside chamber.	<ul style="list-style-type: none"> • Excessive refrigeration. • Cooling caused by specimens. • High overcool protector setting. 	<ul style="list-style-type: none"> • Turn POWER key OFF. • Remove trouble - causing specimens. • Check overcool protector setting.
PERSONAL SAFETY (Option)	1 9	●		<ul style="list-style-type: none"> • All systems down. (including all air conditioners) • Alarm buzzer emitted. 	Emergency stop switch inside the chamber was triggered. (Detected even while the chamber is not running.)	Someone inside chamber triggered emergency stop switch.	<ul style="list-style-type: none"> • Press reset button on operating panel and check inside chamber. • Free personnel from inside. • Turn POWER key OFF and ON again.
DEHUMIDIFIER ERROR (Option)		●	B U	<ul style="list-style-type: none"> • Dehumidifier only stops operating. • Operation continues uninterrupted. 	Safety device for external dehumidifier tripped.	See dehumidifier' s instruction manual for error description and cause.	<ul style="list-style-type: none"> • Turn main power breaker OFF. • Eliminate cause of error inside dehumidifier.
INVERTER ERROR (Option)		●		Test system down.	Error detected in velocity variable device inverter. (air circulator fan).	Inverter error.	Turn POWER key OFF and ON again.
EXTERNAL EQUIP - MENT : ERROR INPUT (Option)		●		<ul style="list-style-type: none"> • All systems down. (including all air conditioners) 	Error detected in connected external unit. (Detected even while the chamber is not running.)	See external unit' s instruction manual for error description and cause.	<ul style="list-style-type: none"> • Turn POWER key OFF. • Eliminate cause of error inside external unit.

Alarms related to optional equipment

Displayed message	C O M P	Type of alarm		Equipment response	Description	Probable cause (s)	Remedy
		E r r o r	W a r n i n g				
EXTERNAL EQUIP - MENT : WARNING INPUT (Option)			●	Operation continues uninterrupted.	Warning condition detected in connected external unit. (Detected even while the chamber is not running.)	See external unit' s instruction manual for error description and cause.	Eliminate cause of error inside external unit. Operation is restored automatically when warning state is cleared.
EMERGEN - CY STOP SWITCH INPUT ERROR (Option)		●		All systems down. (including all air conditioners)	Emergency stop switch triggered (Detected even while the chamber is not running.)	Emergency stop switch was pressed for some reason.	<ul style="list-style-type: none"> • Check why switch was pressed. • Turn POWER key OFF and ON again.